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SELECTED TRANSLATIONS ON USSR COMMUNICATIONS (4)

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## FOREWORD

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SELECTED TRANSLATIONS ON USSR COMMUNICATIONS (4)

This is a series publication containing translations of items concerning communications in the USSR. The items contained herein, covering the subjects listed in the table of contents below, were taken from various newspapers, periodicals, etc., published in the USSR 16 November 1960 - 18 December 1960.

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SELECTED TRANSLATIONS ON USSR COMMUNICATIONS (4)

RADIO RELAY COMMUNICATIONS IN KAZAKHSTAN--Alma-Ata, Narodnoye Khozyay-tzo Kazakhstana, No. 9, 1960, pages 46-48

A great deal of attention is being paid to the development of radio relay communications in the Kazakh SSR. The Alma-Ata-Frunze Radio Relay line is already operating. It is a continuation of the Frunze-Tashkent main line. By using one of the peaks of the Kurday mountain range for construction of an intermediate station, it was possible to limit the Alma-Ata--Frunze section to one high-altitude repeater station located at a height of 3,000 meters above sea level.

A small hydroelectric power station was built at the base of the mountain together with a high-voltage power transmission line to connect the hydro station with the radio station.

One telephone channel on the Alma-Ata--Tashkent radio relay line costs one-tenth as much as the same channel on an aerial communications line.

In 1961, it is planned to install television apparatus on the Alma-Ata--Frunze--Tashkent line. This will provide for the exchange of television programs between the three Union Republic capitals. Later on, Alma-Ata will be able to receive television programs from Moscow with the aid of this same line.

A long radio relay line is under construction in Kustanayskaya Oblast. The modern apparatus to be installed on this line will not only provide for a large telephone channel capacity, but also for the reception of the television program of the Chelyabinsk television center, and later on the Moscow television program via Sverdlovsk. Thus in the next few years, the population of Kustanay Rudniy, and neighboring populated points will be able to see broadcasts of the Moscow television center.

During the Seven-Year Plan, new radio relay lines are planned in Akmolinskaya Karagandinskaya Oblasts, and in the southern parts of the Kazakh SSR. When these lines are completed in a few years, workers in virgin-land oblasts and industrial rayons in the central part of the Republic, residents of Dzhanbul, Chinkent, and other cities will also be able to receive the broadcasts of the Moscow, Alma-Ata, and other television centers in the Soviet Union.

By the start of 1960, over 1,000 kilometers of intra-oblast and intra-rayon radio relay lines have been built in Kazakhstan. Wide use is being made of four-channel equipment in this area. It is being utilized not only for commercial communications, but also for dispatching, remote control electric power stations, etc. Four-channel communication has been developed in a particularly wide manner in Kokchetavskaya, Karaganzinskaya, Akmolinskaya, Kustanayskaya, and Gur'yezskaya oblasts. There are six such lines in operation in Kokchetavskaya Oblast alone--G. Arakelov, Engineer.

TELEVISION CENTER OPERATING IN PSKOV--Moscow, Sovetskaya Rossiya,  
18 November 1960

The small television center in Pskov has made experimental broadcasts. Broadcasts are now being made three times a week.

RADIO AND TELEVISION RECEIVERS IN TBILISI--Tbilisi, Zarya Zostoka,  
22 November 1960

At present, there are about 45,000 television receivers and about 100,000 radio receivers in the city of Tbilisi.

GOMEL' TELEVISION CENTER CONNECTED WITH MOSCOW IN KIEV--Moscow, Trud,  
23 November 1960

The Gomel' television center went into operation recently. Its broadcasts can not only be received in cities and villages of Gomel'skaya Oblast but in several regions of Bryanskaya and Chernigovskaya oblasts.

The Gomel' television center is connected by radio relay line with Moscow and Kiev.

FIRST AUTOMATIC TELEGRAPH EXCHANGE IN THE USSR--Zil'myus Sovetskaya Litva, 25 November 1960

The first automatic exchange for the reception and transmission of telegrams in the USSR has gone into operation in the Estonian SSR under the direction of the All Union Scientific Research Institute of Communications. The system of direct connection telegraph channels, which is similar to the automatic telephone exchange system, first connected all cities and populated points in the Estonian SSR.

USSR TELEVISION DEVELOPMENTS--Moscow, Radio, No 11, 1960 (page 18)

At the present, there are ninety-four powerful television stations and about one hundred sixty television relay stations in operation in the Soviet Union. During the first 1.5 years of the Seven-Year Plan, twenty-nine television stations and more than seventy relay stations were put into operation.

RADIO RELAY LINES IN TADZHIK SSR--Stalinabad Kommunist Tadzhikistana,  
29 November 1960

Construction work has started on a radio relay line between Stalinabad and Kulyab. A relay station will be installed which will

make it possible to receive Stalinabad television broadcasts in populated points of the Vakhshskaya Valley and the southeastern part of Tadzhikistan. The radio relay line will go into operation in 1961. It will also improve the audibility of radio broadcasts and telephone communications.

The Stalinabad-Tashkent radio relay line will be of even greater interest, the construction of which will begin in 1961. When construction work is completed on this line, broadcasts of the Stalinabad Television Center will be seen in Leninabadskaya Oblast (the entire territory of the oblast) and neighboring regions of Uzbekistan and Kirgiziya.

FACSIMILE SERVICE FOR ARKHANGEL'SK--Moscow, Moskovskaya Pravda, 18 December 1960

The newest transmitting-receiving facsimile apparatus "Neva" has been installed in Arkhangel'sk.

TELEVISION SETS IN ARMENIAN SSR--Yerevan, Kommunist, 18 December 1960

At present, there are 35,000 television installations in the Armenian SSR.

COMPLETE THE RADIOFICATION OF THE COUNTRY -- Moscow, Radio,  
No 12, 1960, pages 1-2

Striving toward a better and more complete fulfillment of the political and cultural needs of the workers, the Communist Party and the Soviet government are devoting a great deal of attention to the development of the radio reception network. Over the first  $1\frac{1}{2}$  years of the Seven-Year Plan alone, the number of radio reception points increased by 7,830,000, thus raising the total number of such points to over 47 million as of the start of the first half of 1960. If, moreover, one were to look at the entire post-World War II period, then it would have to be said that in that time, the number of radio reception points has grown by over seven times; included in this is a 17-fold increase in the number of points in rural areas. About 30,000 radio rebroadcasting installations have been put into operation, and over a million kilometers of aerial transmission lines and cables have been laid throughout the country.

The work on the establishment of radio communications facilities is being conducted on the basis of an ever more extensive application of new and progressive technical methods. Powerful automatic radio relay installations and substations are replacing the small, economically unprofitable rebroadcast facilities. Light underground cable lines insulated with polyvinyl chloride are coming into use to replace aerial transmission wires. The cost of such cable lines is half that of the aerial wires; the former, moreover, function with a considerably greater degree of stability and reliability. The cables are laid mechanically with the aid of comparatively simple and inexpensive cable-laying machines.

The application of new technical methods provides a solid basis for increasing the development rate of the radio reception network and expecting the fulfillment of tasks on the completion of the radiofication of our country as set forth in the Seven-Year Plan ahead of schedule. All that is necessary is to make wise use of the available possibilities and to mobilize locally available internal resources.

The villages must receive special attention. In spite of the fact that in the post war years the rate of radio communications development in the rural areas of a number of republics, krays, and oblasts was sufficiently high, there are still serious lags in this field. Although, for example, early this year, up to 75% of the kolkhoz households in the RSFSR, the Ukrainian SSR, and the Belorussian SSR had been equipped with radio receivers, only

about half of the kolkhoz farmsteads in the Moldavian and Estonian SSR were so equipped. In the Lithuanian and Georgian SSR about two-thirds of the families living in rural areas have no radio reception points and are consequently denied the opportunity of hearing broadcasts. There is still a considerable number of rural population centers in the other Soviet republics which are not able to receive radio broadcasts.

Such a state of affairs cannot be tolerated. The interests of Communist construction make it mandatory that the rates of radio communications development be increased sharply in order to hasten the arrival of that moment when the voice of Soviet radio will be heard in all corners of our boundless territory. The solution of this important problem requires that more extensive efforts be made to attract the general public, the kolkhoz administrations, and the collective farmers themselves to participate in the radiofication program.

A fine example in this respect has been set by the Penzenskaya oblast. Bearing in mind the important role of radio in the general system of ideological work, the Party committee for the oblast, having made a thorough study of the available potentialities and consulted with the Party activists, adopted a resolution calling for the radiofication of all rural population centers in the oblast by the end of 1960. It was decided to supply the larger villages with wire transmission facilities, and the smaller ones of up to 30 households with wireless sets. The realization of this goal required the construction of 50 radio relay installations, the laying of about 4,000 kilometers of transmission line, and the establishment of 54,000 radio reception points.

It is not everywhere, however, that such attention is devoted to this important state task. Seriously lagging in the rural radiofication program are the Orlovskaya and Tul'skaya oblasts. The plan assignment for the development of the radio reception network for the first half of the year in the Grodnenskaya oblast was not completed. To a great extent this may be explained by the fact that, as was pointed out by a collective from the Communications Ministry of the Belorussian SSR, the heads of the communications offices stopped attending to radiofication problems and laid the entire task of fulfilling the plan on the shoulders of the construction and installation administrations.

Radiofication work in the Tadzhik SSR is likewise proceeding unsatisfactorily; only 60% of the kolkhozes, and even a lower percentage of collective farms in some rayons of this Republic is equipped with radio communica-

tions facilities. Thus, for example, of the eleven kolkhozes in the Moskovskiy Rayon, only two have radio, while only one of the five kolkhozes in the Dzhigatal'skiy Rayon is so equipped. In the Kirgiz SSR, only 40.7% of the annual planned increase in the number of radio reception points was realized in an eight-month period.

The July Plenum of the Central Committee of the Soviet Communist Party called to the workers to raise the level of creative initiative in the struggle for the greater acceleration of technical progress, for the improvement of qualitative indices, and for the ahead-of-schedule fulfillment of the tasks set forth in the Seven-Year Plan. The Plenum of the Central Committee recognized the necessity for accelerating the work on the radiofication of cities and rural areas.

Answering the call of the beloved Communist Party with concrete, practical acts, the radio communications specialists of the Kiyevskaya and Khar'kovskaya oblasts, having joined the movement in behalf of the Communist effort, decided to assist their comrades in the Stalinskaya, Luganskaya, and Khersonskaya oblasts who were lagging in the fulfillment of the radiofication plan. They commandeered brigades of highly-qualified specialists out to these areas; these experts participated in the work of constructing, mounting, and assembling the equipment and facilities, and shared their experience with the local workers. This glorious patriotic gesture, which serves as an example of the new, communistic attitude of Soviet people to labor, deserves to be copied extensively.

The basic trend of technical policy in the field of radiofication is directed toward the fullest possible automation of urban and rural radio relay centers with the aim of sharply curtailing labor costs. But although over 90% of the urban substations have already been automated, this work is just beginning in the rural areas. Suffice it to say that at the present time the rural radio relay points are being operated by over 75,000 persons, whose work is frequently unproductive and ineffectual.

A reliable solution to this problem has been found recently. What we have in mind is the introduction of remote control of the rural radio relay network from the rayon center; this involves the replacement of manually-operated relay points at kolkhozes and sovkhozes (state farms) with automatic substations. Special remote-control substations operating on semiconductors which receive not only the broadcast signal, but also electrical power along aerial transmission lines of the intra-rayon network, have been designed for use in small population centers.

A special system (SVR-ADU) for transmitting broadcasts to large rural radio relay centers and transferring them onto the remote network controlled from the rayon center has already been developed; its testing has given completely satisfactory results.

The advent of new apparatus creates a basis for the extensive automation of the rural radio relay network. Already today it appears possible to automatize the major portion of the relay points within the next few years. It is now up to industry to assure the production of the necessary equipment in the required quantities.

It should be pointed out, however, that the radio communications specialists are quite correct in making serious complaints about the industry people. Let us look, for example, at the state of affairs as regards preparations to manufacture the SVR-ADU. The prototype of the system has been constructed long ago at one of the factories under the Bashkir sovnarkhoz (council of national economy). It successfully underwent a series of tests, was approved, and the project was confirmed by the appropriate agencies. It would seem that the factory should at that time have organized as quickly as possible the mass production of the new system. There are no plans to do this even in the coming year of 1961, however, since instead of the 200 SVR-ADU systems required by the USSR Communications Ministry for the most urgent tasks, the plans for the factory drawn up by the sovnarkhoz include the construction of just two such systems. This means that the application of newly-available technical advances is to be put off for yet another year, and that the development of rural radiofication will proceed as before on the basis of obsolete equipment which fails to meet modern requirements.

Rural radio relay points have a great need for simple and economical automatic diesel generators. Such equipment has already been designed and will be manufactured by enterprises under the Latvian sovnarkhoz. But -- only starting in 1962! For some reason, the sovnarkhoz considers it possible to continue producing outmoded non-automatic diesel generators in 1961.

The situation is still poor as regards the mechanization of the erection and maintenance of aerial broadcast transmission lines. This type of work, which is both extensive and extremely labor-consuming, is at present less than 10% mechanized.

An exceptionally important problem is that of putting into operation multi-program transmission line broadcasting in cities. This is especially important for cities in the Soviet republics, in which it is absolutely

necessary to have at least two programs: one in Russian, and the other in the language of the basic nationality of the republic. Work has recently been completed at the scientific research institute of the USSR Communications Ministry on the development of a three-program broadcasting system. It involves installing a very simple attachment in the listener's receiver which would enable him to obtain two additional programs carried by the radio relay network at high frequencies. It is necessary that the mass-production of both transmitting equipment and the receiver attachments be organized as quickly as possible. This is being demanded insistently by the interests of large groups among the listening public.

It is the responsibility of those working in scientific research institutions and in industry to take all necessary measures which would assure that the directives of the July Plenum of the Central Committee of the Soviet Communist Party regarding the acceleration of work on the radioification of cities and rural areas be successfully realized.

Along with the development and technical refinement of radio communications equipment, it is also necessary to continue diligently the work of improving the operation of station and line facilities and increasing the level of services being provided the public.

Soviet radio communications specialists face the important problem of accelerating the completion of radio communications facilities in our country, in order that in the very near future every Soviet family may have radio in its home.

THE DEVELOPMENT OF COMMUNICATIONS FACILITIES IN THE USSR --  
Moscow, Planovoye Khozyaystvo, No 12, 1960, pages 24-31

The organization of communications facilities based on the utilization of the latest technical methods and equipment plays a huge and ever-growing role in the national economy of our country. The gross product put out by all branches of the communications industry in the Soviet Union reached 13 billion rubles in 1960. This is over ten times in excess of the communications industry gross product for pre-revolutionary Russia. The net income of the communications industry amounted to a sum of about 4 billion rubles. Over 730,000 workers are employed by the communications industry enterprises. The basic industrial funds of this branch of the national economy are estimated to amount to over 20 billion rubles.

The Seven-Year Plan for the development of the USSR national economy includes major steps toward the further extension and technical improvement of nation-wide communications facilities on the basis of the latest achievements of science and technology. The planned scale and growth rates for the development of communications facilities are huge. The extent of the main cable lines is to double within the seven-year period, while the extent of major radio relay lines is to be increased by 8.4 times. In actuality, the efficiency potential of the transmission line network will increase on a considerably larger scale, since new communications equipment has a transmission capacity far in excess of that used formerly. Thus, the 12-channel lines now being used extensively will be supplanted by coaxial and symmetrical cables and radio relay lines. Two properly equipped coaxial cable lines can simultaneously carry 1920 telephone calls, while two other lines in the cable can serve as television transmission channels carrying signals in different directions, and in addition are capable of carrying 300 more telephone calls. The main radio relay lines can carry 720 telephone calls or a television program along three branches. The communications cables and radio relay lines which span great spaces in our Motherland consequently create the most extensive possibilities for the transmission of various types of information across large distances.

Significant changes will take place during the seven-year period in local telephone communications. Both the urban and rural telephone communications networks will be extended considerably, mainly on the basis of automatic telephone stations. The total capacity of the urban telephone networks will have been increased by 1.5 times by the end of the seven-year period. This will allow for double the present number of private telephones and a three-fold increase in the number of pay phones. In the rural areas, the number of telephone stations will increase ten times, while the number of telephones will double. The provision of rural Sovets and kolkhoz (collective farm) administrations with telephone facilities will be completed in 1961. As a result of the realization of the seven-year plan for the development of communications facilities, all of the sovkhozes (state farms) and not less than 25% of the kolkhozes in the country will have internal-service telephone communications stations.

Even on a larger scale will be the growth of radio and television broadcasting in the country. The total radio broadcasting facilities will be increased by 60%; the total number of receivers will increase to 69 million. 100 new

television centers and stations will be put into operation. At the present time, there are approximately 4 million television sets in our country. Within the next few years, this figure will reach 15-20 million, thus allowing over 100 million persons to view television broadcasts. In the field of television engineering, there is the extremely timely problem of extending communications channels in order to expand the areas of television coverage. On the experimental level, this problem has been handled through the use of air-borne relay stations. It would be very tempting indeed to create a space relay station carried aloft by an artificial earth satellite.

A combination of television, electronic computers, and automatic communications channels opens up a new field of technical progress in communications and creates a highly promising outlook for the use of television techniques in industry, transportation, and agriculture. We are now on the threshold of a new phase in communications development which will bring with it the possibility of remote control over industrial processes from any distance whatever.

Considerable improvements are likewise being made in postal communications which are resulting in a sharp curtailment of mail and printed-matter delivery time. The material basis for postal communications at the present time consists in the various forms of rapid transport such as jet airplanes and helicopters, as well as in the thorough mechanization and automation of postal system sorting processes.

Thus, two major trends of nation-wide communications development in the USSR are coming into clear focus. In the first place, there is the creation of a highly developed network of major coaxial and symmetrical cables and radio relay lines which, along with the extension of local communications, is bringing about a sharp increase in the total electronic communications resources throughout the country. Secondly, there is the progressive automation of processes for the transmission of all forms of information which is significantly increasing the conveyance rate and duplication accuracy of messages, and bringing about a greater stability in the functioning of communications channels. Together, these developments are creating a material base for the realization of a single, integral, and all-inclusive nation-wide electronic communications network capable of satisfying the growing industrial, cultural, and everyday needs of a society engaged in building the material and technical base for Communism. Work on the creation of such a system is unfolding during the current seven-year period. In the future, the inter-urban, municipal and rural telephone networks will merge into a single automated complex.

The July (1960) Plenum of the CC CPSU devoted serious attention to the rapid and extensive development of communications facilities, one of the most important factors in the successful fulfillment of the tasks of the Seven-Year Plan. In discussing the course of fulfillment of the directives adopted at the 21st Party Congress with reference to the development of industry, transportation, and the introduction into industry of the latest scientific and technical achievements, the Plenum delegates emphasized the important role and great significance of technical progress in the communications field in improving the production indices of all branches of the national economy; the Plenum then proceeded to direct the USSR Gosplan and the Council of Ministers of the Soviet republics "to take measures toward the more rapid construction of major cables and radio relay lines and the acceleration of work on the establishment of telephone and radio communications facilities in rural areas."

Highly-developed and technically perfected communications facilities are an indispensable element in the creation of a material and technical base for Communism. In his appearance before the July Plenum of the CC CPSU, USSR Academy of Sciences President A. N. Nesmeyanov with full justification remarked as follows: "The higher the economic, technological, and cultural level of a society, the greater is the role played in it by communications. Along with the development of numerical machine-calculated information, there will be further growth in the standard forms of information conveyance -- the telephone, television, etc. All this requires the creation of an integral nation-wide system for conveying all forms of information." The establishment of such a system becomes all the more necessary if to the numerical information facilities which have to do with the planning and accounting control, or analytic functions of the governmental apparatus, we add the use of communications channels for programmed regulation of industrial processes with the aid of computer techniques.

The automation of production processes rises to a higher level with the advent of self-regulating machinery and apparatus controlled with the aid of computer devices, as well as the use of the techniques of tele-mechanics which permit the regulation of mechanisms at a distance. Telemechanics is already being used today in work having to do with the peaceful uses of atomic energy. There can be no doubt that this field has a great future in all branches of the national economy.

Soviet scientists have created devices for regulating from the earth information and image-taking devices

located aboard space ships. If this was achieved under the conditions of astronomical distances and moving objects merely with the aid of radio communications methods, then how great must be the potential of modern technology for using the arsenal of communications techniques employing wires and radio under terrestrial conditions!

The possibilities for employing communications channels as tools of automation and telemechanics have as yet not received thorough exploration. In particular, no calculations have as yet been made which would permit us to determine the economic advantage of constructing lines of communications with high-capacity channel clusters for controlling from a single center the telemechanical industrial process regulation of an entire complex of peripheral enterprises (plants, factories, etc.) performing similar technological functions. It is clear such an undertaking would yield considerable savings in human labor costs, greater efficiency in the organization of production, and would rationalize both industrial processes and the transportation of manufactured articles. And would it not indeed be more economical if, instead of creating local computer stations, there were to be established an extended and higher-capacity network of communications lines, whose channels could be used to carry computational and programmed operation signals from a single center? The application of the latest communications techniques also opens up wide perspective for the furtherance of scientific research endeavors. The exchange of various types of information with the aid of videotelphonic, wirephoto, and telephonic techniques between scientific bases and research parties, as well as the use of telemechanics and computer devices will greatly hasten the processes of scientific research and investigation.

All of this serves to reveal a new aspect to the application of communications facilities as one of the important trends in technical progress and as an indispensable element in the most advanced forms of industrial organization which assures the acceleration of national economic growth rates.

In addition to plans for working out a theory of self-regulating systems, for the study of laws governing industrial process, and their mathematical formulation, the seven-year scientific research plan of the USSR Academy of Sciences calls for work on a number of problems in electronics and communications. The time has come, when, apparently, not only the Academy of Sciences, but also the specialized scientific research institutes and industrial laboratories should include in their work-plans

the study of the methods and effectiveness of applying the latest communications techniques in industry. This would allow for a correct appraisal and assure the satisfaction of the needs of the national economy as regards communications facilities, and would also make for more rational capital investment funds allocation in striving for the more effective utilization of such investments.

Unfortunately, insufficient attention is being devoted in our everyday practice to the utilization of communications facilities as a tool of technical progress which aids the growth of labor productivity. There still remain in our country some enterprises, sovnarkhozes, and ministries which see a means of effecting financial savings and lowering production costs in curtailing expenditures falling into the category of "postal and telegraph expenses", thus bringing on production losses which result from poorly organized communications. A lack of rapid and efficient exchange of vital information results in delays in receiving instructions and orders relating to current matters of industrial, transportation, and marketing organization, the impossibility of rapid photoelectographic transmission of blueprints and other planning documents, the disruption of industrial and construction work tempos, as well as labor and equipment idleness; thus, significant portions of the available operational and material resources are temporarily excluded from state use. Some sovnarkhozes, ministries, and departments (vedomstva) not fully served by general state communications facilities proceed to establish their own communications systems; this leads to dispersal, uneven distribution, and irrational utilization of capital investment funds. It must be pointed out that the problem of cooperation and coordination in the establishment and exploitation of communications facilities under various agencies (vedomstva) and the USSR Communications Ministry is still awaiting its solution.

The time has come to change the attitude toward expenditures on communications facilities. In struggling against unjustified extravagance in the disbursement of state funds, it is nevertheless impossible to limit mechanically the utilization of technical communications facilities. On the contrary, every effort should be made to foster the employment of this important tool of technical progress in the interests of the efficient regulation of the planned national industrial system.

It is necessary that every enterprise, trust, sovnarkhoz, and ministry find ways and means for the widest and most rational introduction of the latest communications tools not only into the technique of industrial

regulation, but into production technology itself as well. Along with the automation and telemechanization of industry, this must become one of the leading trends of technical progress in our country, and this fact must be reflected in the future growth plans of enterprises and branches of industry.

The Ministry of Transport, Ministry of Power Plant Station Construction, the Main Administration of the Gas Industry under the USSR Council of Ministers, the Main Administration of Petroleum Marketing under the RSFSR Council of Ministers, the Rivers and Ocean Transport Ministries, and several other agencies (vedomstva) are planning the development of communications facilities. It is true that they are doing this largely with relation to their own intradepartmental facilities. But there is no reason why there should not be similar success in formulating plans to satisfy the needs of the nation-wide communications system; this requires that the planning organs requisition appropriate estimates from all organizations and enterprises involved in the national economy. The needs as regards communications facilities must be reflected in the financial balances of the national economy. Then the USSR Communications Ministry will receive thoroughly and firmly based plan assignments for the development of a nation-wide communications network closely integrated with all branches of the national economy. At the same time, it is necessary to find out just how rational is the use being made by the individual agencies in exploiting their own communications facilities. In a number of cases it would be expedient to turn these facilities over to the nation-wide system, thus reducing costs for their extension and exploitation, as well as assuring a fuller and more thorough fulfillment of the communications requirements of the entire national economy.

The development and improvement of communications, the extensive application of its modern technical possibilities will yield considerable economy in general labor expenditures. Modern technology will permit the transmission of various forms of information with the speed of light, thus making it possible to accelerate and improve a large number of organizational and production processes in various branches of the national economy -- industry, transport, construction, supply, marketing, etc. Equipped with high-capacity communications channel clusters and television, electronic computers will make it possible in a matter of minutes to process data from any number of sources, and, having performed the required generalizations and program calculations, to convey the finished results

to the regulatory centers, as well as to transmit operational assignments worked out on the same computers to local enterprises with the same speed. This will release large contingents of planning, accounting, and clerical supply employees for work in other fields. Considerable savings can likewise be effected through the application of the latest communications techniques to the circulation of documents, as well as to financial and monetary-credit operations.

The study of the national economic effectiveness of modern technical communications facilities as one of the tools for raising general labor productivity has now acquired extreme timeliness. Life itself dictates the necessity for a sharp acceleration of development in national communications facilities, in order that in this field, as in the other branches of material production, the Soviet Union may surpass the level of the developed capitalist nations in the shortest possible time. This will provide the possibility for a further considerable increase in general work efficiency and productivity.

Communications is a technically highly developed branch of productive endeavor, which under the conditions of a socialist society functions with conformity to the tasks of the national economic plan. For the fulfillment of production plans, communications enterprises are provided with the necessary labor, which, according to the Central Statistical Bureau USSR classification comes wholly under the category of industrial resources, while the labor of communications workers is divided between the material and non-industrial spheres. Communications production is also accordingly broken down into two classifications: that portion of it which is created in the process of servicing industrial enterprises and branches of the national economy comes under the heading of material production; the remaining portion, created in the process of serving non-industrial organizations and the general public is regarded as a service that does not enter into the total public product and national income. Such an artificial classification of the labor of communications workers and its products into industrial and non-industrial spheres engenders divergent attitudes as regards this sector of the national economy. The concern with producing the greatest possible quantities of material goods is an incentive toward giving priority to material production areas in the distribution and allocation of labor and financial resources. Under these conditions, communications finds itself occupying something of an intermediate position between the industrial

and non-industrial spheres, and is therefore frequently deprived of advantages possessed by other fields of material production; all this has a negative effect on the rate of development of communications.

A pre-conditional factor in the general social productive process consists in a communications development rate surpassing that of the other branches of the economy. The actual dynamic of this development does not conform to this axiom, however. If the total volume of capital investments in the national economy is taken as 1, then in the first Five-Year Plan, capital investments in communications amounted to 0.97, in the second Five-Year Plan they rose to 1, dropped down to 0.58 in the fourth Five-Year Plan, to 0.53 in the fifth Five-Year Plan, and finally in the current seven-year period have again risen somewhat, totalling 0.6. It seems to us that if communications were locked upon as a segment of the material production sphere, then the development of communications facilities would receive considerably more attention.

Material production is nothing more nor less than the transforming action of human labor upon natural substances with the aid of the tools of production. In the various branches of communications, such a relationship is perfectly evident. Communications facilities represent the resources of production. The objects of labor consist in material information carriers: letters, newspapers, and other mail in postal communications; texts, drawings, blueprints, and photographs in telegraphy; sound in radio and telephony; and light in television. The transforming action of labor on its object is exercised in postal communications in the spatial transference of mail with the aid of transportation facilities. In all forms of electronic communication, this action consists in the spatial conveyance of a given type of information through the transmission and transformation of various forms of energy.

It is important to emphasize there is no difference either in the character of the labor process, or in the objects and tools of work in the provision of communications services to the industrial or non-industrial spheres. The production process in communications enterprises is not in the least altered by the fact that in one case their services are utilized by plants, factories, mines, or agricultural enterprises, while in the other instance -- by various agencies and individuals. Thus, for example, electric power stations supply electricity to producer-enterprises and at the same time serve the everyday needs

of the population. Regardless of what use is made of electrical energy, the work of electric power stations is classified solely as material production. Despite this fact, the method of the TsSU in determining the place of the "conveyance industry," i.e., transportation and communications in the system of general production has been, for some reason, to classify these fields according to the character of consumption.

Communications represents a single and integral productive and economic complex, and the unity of the production process in this complex is in no way violated by the simultaneous servicing of the industrial and non-industrial spheres. For this reason, in our opinion, communications must be in its entirety included among the sectors of the material production sphere. Correspondingly, the gross product of communications services should be included not partially, but totally in the gross product of society; its net product, furthermore, should be totally included in the total national income of the socialist state. The branches of the communications field should be looked upon as branches of material production, and this view must be made basic in the allocation of capital investments in relation to and in the planning for the labor, material, and financial resources necessary for their continued operation and development.

There can be no doubt that the expansion of capital investment in the various sectors of communications will in a short time pay for itself through the large effective yield which they will provide to the entire national economy, not to mention the advantages that will accrue as a result of reduced operating costs for the communications system itself, and the income to be realized from the increased productivity of communications facilities. Some idea of these advantages may be had from the following figures: the cost of operating a single channel-kilometer of coaxial cable with 1920 channels is over 170 times lower than the cost of using a three-channel aerial line. Approximately the same picture is provided by cost calculations for radio relay lines: the cost of operating one channel-kilometer of symmetric cable within a 60-channel system is eight times lower than that for a 12-channel system, and almost 20 lower than that in a three-channel system using aerial lines. Taking as a basis the minimal figures and assuming that the cost of a telephone message-unit will be reduced by only 5 times on the average as a result of the technical reconstruction of communications channels, then it is

apparent that even in this case the telephone service charges with a single, extensively automated communications network will be almost on a par with postal charges.

These calculations, despite their strictly approximate character, constitute sufficient evidence in favor of the argument that increased capital investment in the development of communications facilities will pay for itself very rapidly. It may be said with complete confidence that even with considerably reduced charges, the time for a full return of the net investment will not exceed four or five years. But more important still are the tens of billions of rubles in savings which will be effected by the national economy through the fuller and more extensive use of communications facilities in industrial processes and control technology, as well as the saving in time achieved thereby.

The development and improvement of communications facilities is of enormous importance in the effort of building the material base for Communism. Being a significant factor in the economization of time, communications plays a major role in surpassing the capitalist level of labor productivity. This fact places among the primary immediate tasks the study of the national economic effectiveness of communications, the investigation of new trends for its application, and the assurance of assignments appropriate to the construction of the technical-material base for Communism through the establishment of a proper scale and rate of development for all sectors of the nation-wide communications network.

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